# THE WALTER AND ELIZA HALL INSTITUTE OF RESEARCH IN PATHOLOGY AND MEDICINE

## THIRTEENTH ANNUAL REPORT

1931-32

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General Sir John Monash, Vice-Chancellor of the University of Melbourne, who in that capacity had been a member of the Board of the Institute since 1923, died on October 8th, 1931. Despite his manifold public activities, he was unflagging in his interest in the Institute, and brought to its service his great personal gifts. His alertness of perception, his keen and decisive judgment, his wisdom in counsel, and his wide knowledge of men and things have contributed in no small measure to the progress of the Institute.

# The Thirteenth Annual Report

OF THE

# Walter and Eliza Hall Institute of Research

July, 1932.

The work of the Institute has, to some extent, been hampered this year by lack of funds. The greatest economy has been necessary throughout in expenditure on apparatus and materials, and the salaries of the staff have been considerably reduced.

The Felton Bequest have continued their help to us, unfortunately of necessity on a somewhat reduced scale, and grants of £100 and £600 from the Commonwealth Department of Health have provided for the expenses of the materials for work on anterior poliomyelitis and of those of the collection of snakes.

We are greatly indebted to Mr. A. M. Nicholas, who has presented the Institute with a Matthews oscillograph, which, we hope, will be available shortly.

The number of persons desirous of extending the boundaries of knowledge who have the capacity to do so, is limited. It is the more important, therefore, that every facility should be provided for them.

The regular staff of a Research Institute are continuously engaged in research, and are in a position to advise respecting the desirability of investigating a particular problem and the capacity of anyone who wishes to do the work. It is most desirable that an Institute of this kind should have an unallotted income to facilitate such research whenever the opportunity occurs.

For instance, if such a fund were available a person desirous of doing a special piece of work could be employed, the engagement to cease when the work terminated. If no one were immediately available the money would not be spent but would be held awaiting an opportunity of spending it properly. For this reason it seems advisable to build up a Research Endowment Fund, the interest to be applied in the manner indicated. Like all funds of the kind, it would begin in a small way, but might ultimately assume useful proportions.

At the end of 1931, Dr. F. M. Burnet, who for four years had been Assistant Director, left us to do special work on filterable viruses at the National Institute of Medical Research, London. His work here on staphylococcal toxins, on the interaction of antibody and antigen, on Schwartzman's reaction, on cellular immunity and on bacteriophages has been very fruitful, and we shall greatly miss him. We wish him every success in his new post.

At the same time, Mr. Donald F. Thomson severed his connection with us to continue his anthropological work in Northern Queensland. Mr. Thomson, during the last two years as a part time member of the staff, has been carrying out systematic work on the australian ophidians. We wish him also good fortune in his new venture.

After Dr. Burnet's departure, Mr. H. F. Holden was appointed to act temporarily as Assistant Director.

In June, Dr. Ivan Connor was appointed Assistant Director. Dr. Connor was Stewart Scholar in Pathology at the University of Melbourne in 1915, and again after the war in 1920. He later acquired further bacteriological experience at the Commonwealth Serum Laboratories. He has just returned from Europe, where he has been engaged in post-graduate studies.

## The Work of the Institute.

### *Australian Snake Venoms.*

We have continued the collection of snakes and their venoms. Through the kindness of the President, Council and Director of the Melbourne Zoological Gardens, we have been able to house our snakes there, and retain Mr. Tom Eades' services for their collection and care.

This year we have collected or purchased 183 tiger snakes, 22 death adders, 92 copperheads, 9 brown snakes, 21 black snakes, 1 black tiger snake, 1 green tree snake, 6 carpet snakes, and 3 whip snakes. Mr. Fleay has kindly given us a specimen of *Denisonia flagellata* and one of *Pseudelaps harriettae,* and Mr. Eades brought back from South-West Queensland 2 specimens of *Denisonia suta.*

Of the venoms, we have collected 2.2 grammes of death adder, 17.6 grammes of tiger snake, 21.6 grammes of black tiger venom, 9.3 grammes of copperhead, 4.2 grammes of black snake, and 137 milligrammes of brown snake venom.

The black tiger snakes which we purchased in February, 1931, from the late Mr. Murray, have done extremely well in captivity, and most of them are still alive. They have not, however, given birth to any young this season.

We have been able to procure for Mr. Webb, of the London Zoological Gardens, a number of living specimens of the commoner australian venomous snakes, which he has taken back with him to England.

Through the courtesy of the Navigation Department, and the kindness of Captain J. K. Davis, Mr. Eades was able last November to accompany the lighthouse tender, s.s. Lady Loch, on a round trip to the lighthouses in Bass Strait. In this way a number of islands were visited, and though the weather was bad and the times of arrival and departure of the ship did not always permit of thorough search, we were able to obtain some information concerning the reptilian population.

On Maatsuyker, Goose and Tasman Islands there are no snakes. On Deal Island only whip snakes *(Denisonia coronoides)* are found. On Hunter Island there are black tiger snakes, and on South Bruny Island, as in Tasmania, there are black tiger snakes, copperheads, and whip snakes.

Although Mr. Eades brought back only a few snakes, he was able to make useful contacts in regard to future collecting in this region.

Other collecting trips have been made to Mount Gambier, Tallangatta, and South-Western Queensland.

### *Systematic Work.*

Mr. Thomson has produced evidence that *Pseudechis scutellatus* (Peters) and *Oxyuranus maclennani* (Kinghorn) are synonymous. He has made a detailed study of three specimens identified as *Pseudechis scutellatus,* and has prepared and examined the skulls of two of them. These were found to possess the characters described by Mr. Kinghorn for *Oxyuranus maclennani,* but since some of these characters differentiate the species from any member of the genus *Pseudechis,* he is of opinion that the genus *Oxyuranus* should be retained. He suggests as a vernacular name for this snake the aboriginal "taipan," and notes that this species, unlike those of the genus *Pseudechis,* is oviparous.

Mr. Thomson has described a new species from the head and neck of a very large snake in the National Museum, Melbourne. It appears to be closely allied to *Pseudechis australis,* and like this species comes from Northern Australia.

He has also been engaged on a study of the genus *Demansia,* using the large amount of material available in the National Museum, Melbourne. Unfortunately, Mr. Thomson was not able to complete this work before his departure.

We are greatly indebted to Mr. J. Mahony, Director of the National Museum, for his courtesy in allowing us access to material.

*Publications.*

THOMSON, D. F.:

"Notes on a Large Australian Colubride Snake, *Oxyuranus scutellatus*" (Peters).—The Affinity of *Pseudechis scutellatus* (Peters) and *Oxyuranus maclennani* (Kinghorn).

(In the Press.)

"A Large New Colubride Snake from Northern Australia, *Pseudechis platycephalus, species nova.*"

(In the Press.)

*The Black Tiger Snake and its Venom.*

Dr. Kellaway and Mr. Donald Thomson have made observations on the black tiger snakes obtained last year from Chappell Island. These had a much larger average length and weight than tiger snakes obtained from the mainland and yielded correspondingly larger quantities of venom. The largest single yield was nearly 0.4 grammes of dry venom. Examination of the external characters of these snakes did not, however, warrant their separation from the common tiger snake as a distinct species, though they differed from the latter in the constant possession of body scales in 17 rows (instead of 19 as in Victoria) and in the extreme frequency of variations in the arrangement of the head scales.

This venom was qualitatively similar but quantitatively different from that of the mainland tiger snake, and comparison of the two venoms revealed differences greater than any previously observed between individuals of one and the same species of australian venomous snakes, but of the same order as those observed between venoms of snakes of different species within a genus. The venom of the black tiger snake was found to be much less toxic than that of the mainland form when injected subcutaneously, but has a more potent coagulant action. The two venoms are quantitatively similar in haemolytic power, but black tiger snake venom has a slightly more potent curari-like action. Specific neutralisation of the venom by monovalent antivenine prepared against the venom of the mainland tiger snake showed that this antivenine was much more effective against the venom used in its preparation than against that of the black tiger snake. It was indeed only a little more effective against this than against the venom of the copperhead, 1 c.cm. of antivenine neutralising 78 fatal guinea pig doses of tiger snake venom, 8 of black tiger snake venom, and 5 of copperhead venom.

*Publication.*

KELLAWAY, C. H., and

THOMSON, D. F.:

"Observations on a Melanotic Insular Variety of the Tiger Snake *(Notechis scutatus)*."

Australian Journal of Experimental Biology and Medical Science, 10 (1932), 35.

*The Peripheral Action of Snake Venoms.*

Dr. Kellaway and Mr. Holden have studied the curari-like action of the common australian and of some other snake venoms on the isolated gastrocnemius-sciatic preparation of *Hyla aurea* and on the spinal pithed frog. All the australian venoms were found to possess this action in some degree, though none was as potent in this respect as the venom of the indian cobra. This work has included an investigation of the changes of direct and indirect chronaxie occurring in poisoning by venom, and some observations on the associated inbibition of water by the isolated muscle on the lines developed by Houssay and his colleagues. Finally, with the co-operation of Mr. R. Cherry, of the Department of Natural Philosophy of the University, Dr. Kellaway has attempted to ascertain what part the peripheral action of the venom has in causing death from respiratory failure. The respiratory impulse has been picked up from the phrenic nerve in the neck or thorax; suitably amplified and using a loud speaker, it has been possible to show that the respiratory impulse is still present for considerable periods after failure of respiration has occurred from curarisation of the diaphragm.

### *Snake Venom Haemolysis.*

Dr. Kellaway and Miss Williams, with the co-operation of Mr. Holden, are still continuing their studies on haemolysis by the australian snake venoms, which they hope shortly to complete.

### *Fractionation of Venoms.*

Mr. Holden is making a further attack upon this problem. No completely satisfactory method has yet been evolved for quantitative separation. As indicated in last year's report, ultra-filtration neither through celloidin membranes at moderate pressures nor through kieselguhr filters impregnated with gelatine at high pressure (Martin) gives strictly quantitative fractionation. This is due to the tendency of filterable fractions to drag through with them the less readily filterable constituents of the venom.

Experiments upon adsorption are at present in progress.

During the year Dr. F. G. Morgan, Director of the Laboratories Division of the Commonwealth Department of Health, and Dr. Kellaway contributed to the Medical Journal of Australia a concise account of the treatment of snake bite, and the latter wrote a short account of the common venomous land snakes of Australia for the Bulletin of the Antivenin Institute of America.

### *Publications.*

KELLAWAY, C. H., and
MORGAN, F. G.:
"The Treatment of Snake Bite in Australia."
Medical Journal of Australia, Oct. 17th, 1931, p. 482.

KELLAWAY, C. H.:
"Venomous Land Snakes in Australia."
The Bulletin of the Antivenin Institute of America.

### *Staphylococcus Toxin.*

Dr. F. M. Burnet until last December continued his work on various aspects of the activity of staphylococcal toxin. In collaboration with Miss Freeman, it was found possible to obtain good yields of relatively pure toxin by precipitating the crude filtrates with acetic acid in the cold. The amount of nitrogen per unit of toxin could in this way be reduced to about one-twentieth of that originally present, but from various considerations it seemed likely that the toxin itself formed only a very small proportion of the material precipitated.

The purified toxin, which is relatively highly stable, was used in a more detailed investigation of the influence of formaldehyde on the toxin. The effect of varying the p H at which the formol-detoxication occurred was particularly studied.

It was found that under certain conditions an intermediate product of detoxication accumulates, which has been described as formol toxone. It differs from toxin in possessing a weaker and particularly a slower haemolytic activity, has no power of acute killing on intravenous injection, but retains most of its skin necrotic activity. If the formaldehyde is removed by acetic acid precipitation of the toxin, most of the toxone present can be reconverted into toxin by incubation for some hours at a reaction of p H 6. The evidence suggests that in all circumstances the formalin gives rise to a series of consecutive reactions, toxin—>toxone—>toxoid—>non-antigenic final product, but that the velocities of the respective reactions differ greatly according to the conditions. When the standard method of haemolytic titration is used to study the process of formalin detoxication, the reaction, whose velocity is being measured, is the toxin-toxone conversion. This reaction is influenced by three important variables: the concentration of formaldehyde, the temperature and the p H. Within limits, the speed of reaction is proportional to the concentration of formaldehyde and varies with the p H in accordance with the formula $K = q\,[OH']^{0.5}$, i.e., the rate increases in more alkaline solutions, and is proportional over the range from p H 6.4—p H 10.1 to the square root of the concentration of hydroxyl-ions. Like most inactivations of biological material, the reaction has a high temperature coefficient (4-5 per 10°). The presence in the reaction mixture of other nitrogenous compounds which can react with formaldehyde has little influence unless very small amounts of formalin are used at highly alkaline reactions. Under these conditions, the presence of histidine can completely inhibit the action of formaldehyde on toxin.

The recognition of the existence of toxone, in which the haemolytic activity is almost lost, while skin necrotic activity remains nearly intact, allows an explanation of certain observations both in Burnet's previous work and in a recent paper by Weld and Gunther, in which the general parallelism between all the toxic activities of staphylococcal filtrates failed to hold.

### *Staphylococcal Antitoxin.*

The work by Dr. Lucy Bryce and Dr. Burnet on the normal staphylococcal antitoxin of human beings has been completed. As mentioned in the last annual report, the relation of antitoxin to age followed very nearly the same type of curve as is found in studies of the Shick and Dick reactions. A point of interest in connection with this investigation was the finding that skin reactivity to staphylococcal filtrates was not associated with a low antitoxic titre. Purified toxin showed none of the ordinary "Dick" type reactions which are produced in susceptible subjects by crude filtrates.

### *The Production of Antitoxin in the Rabbit.*

The antitoxic response to injection of staphylococcal toxin in the rabbit follows a very regular course provided a basic antitoxic immunity is present before the injection. A series of experiments has been carried out in order to obtain accurate curves of the primary and secondary types of antitoxic response. These curves show the differences between the two types very clearly. The primary response of a normal rabbit only reaches its peak in 12-14 days while the secondary response is usually completed by the sixth day. All the curves of the secondary response to a single intravenous injection showed the existence of a phase lasting, roughly, from 48-96 hours from the injection, in which the changing antitoxin titre followed a logarithmic course. An experimental analysis of the phenomenon led to the conclusion that the logarithmic course of antitoxin increase must signify the existence of an intracellular process involving self-multiplication of certain sub-cellular entities. If this point of view can be substantiated, it may require certain modifications of immunological theory which are discussed.

*Publications.*

Burnet, F. M., and
Freeman, Mavis:

> "The Process of Formol Detoxication: Experiments with Purified Staphylococcal Toxin."
> Journal of Pathology and Bacteriology.
> (In the Press.)

Bryce, L. M., and
Burnet, F. M.:

> "Natural Immunity to Staphylococcal Toxin," Journal of Pathology and Bacteriology, 35 (1932), 183.

Burnet, F. M.:

> "The Production of Antitoxin in the Rabbit."
> Journal of Pathology and Bacteriology.
> (In the Press.)

*Atypical Strains of Dysentery Bacilli.*

In the course of studies of bacteriophage in infantile dysentery a number of atypical strains were obtained, which showed the general characteristics of Flexner dysentery bacilli and appeared to be etiologically associated with the disease, but which could not be placed in the classical types. A study of these strains, both serologically and in regard to bacteriophage reactions, showed the existence of two well-defined groups, which have been described by Miss McKie and Dr. Burnet as types T and U of B. dysenteriae Flexner. In connection with the T strains some interesting observations on increase in agglutinability after treatment with phage were recorded.

*Publication.*

McKie, Margot, and
Burnet, F. M.:

> "Two Groups of Atypical Dysentery Bacilli.
> The Medical Journal of Australia.
> (In the Press.)

*Coli Bacteriophages.*

An attempt has been made to apply the principles of bacteriophage classification developed in previous work on Samonellas and dysentery bacilli to coliform strains. A group of 40 strains from urinary infections was studied by the usual biochemical methods and by the use of bacteriophages. No evidence of natural divisions was obtained from the results of testing with a large series of bacteriophages.

The relation of the S-R interchange to bacteriophage phenomena showed the same character as in other groups of bacteria modified by the higher intrinsic resistance of B. coli to phage and the ease with which the R—>S transformation may occur.

A detailed study of the interrelations of the various phage types and a correlation of phage action over the genus *Bacterium* is not yet completed. The conditions with B. coli are more complicated than with the dysentery bacilli, but the same principles hold for the two species, and when a given phage acts on two or more species its type as determined on any species remains the same throughout.

Further evidence has been obtained that specific absorption of phage to bacterial surface plays an important part in determining lysis.

### *Cellular Immunity and Antibodies in the Tissue Spaces.*

Continuing earlier studies on cellular immunity, Burnet, Kellaway and Williams were unable to demonstrate any increased resistance to staphylococcal toxin in the perfused vessels of the isolated heart and lungs of immunised rabbits. They were, however, able to show that in immune animals antibody was accumulated in the tissue spaces. In experiments upon isolated lungs of immune rabbits, it was possible to remove by perfusion all traces of antibody from the vessels and also of agglutinin which had been injected intravenously to control escape from the vessels during perfusion. Oedema was then produced, and considerable amounts of antibody were found in the oedema fluid collected from the trachea. Experiments in which the animals were actively immunised with B. enteritidis as well as with staphylotoxin showed a striking difference according to whether they were examined after a brief course of immunisation when antibody response was at its height or after a prolonged course of immunising injections. In the former agglutinin and in the latter antitoxic antibody was present in larger amounts in the lung oedema fluid.

These experiments yielded no evidence of any tissue immunity acquired during the course of immunisation with staphylotoxin by tissues specially susceptible to its action.

*Publication.*

BURNET, F. M.,
KELLAWAY, C. H., and
WILLIAMS, F. ELEANOR.

"Cellular Immunity and Antibody in the Tissue Spaces."
Journal of Pathology and Bacteriology, 35 (1932), 199.

*Bacteriological Findings in Puerperal Sepsis.*

Dr. Lucy Bryce, in a short address to the Victorian Branch of the British Medical Association, reviewed the results of current routine investigations made by the staff of the Women's Hospital, together with those of her own work in 1926-28 for the Obstetric Research Committee carried out here and at the Women's and Queen Victoria Hospitals. The results recorded covered the period 1926-1930.

Among 64 fatal cases of puerperal septicaemia, in which blood culture was attempted, 49 yielded positive blood cultures, and of these the infecting organisms in 42 were streptococci, in 4 staphylococci, in 2 Bacillus coli, and in 1 Bacillus welchii. From 121 non-fatal cases there were 23 positive cultures from which, in 11 streptococci, in 4 staphylococci, in 7 Bacillus coli, and in 1 Bacillus welchii were isolated.

Dr. Bryce discussed these results, as well as those concerning the presence of organisms in the genital passages, in the light of generally similar results recently obtained by workers in other parts of the world.

*Publication.*

BRYCE, LUCY M.:

"The Bacteriological Findings in Puerperal Sepsis."
The Medical Journal of Australia, Sept. 19, 1931.

*Anterior Poliomyelitis.*

The work on infantile paralysis has been carried on by Dr. Kellaway and Miss McKie. The fixed local virus used in last year's experiments was found to have lost much of its virulence, but another local strain has been fixed in virulence by passage. A further experiment is in progress to confirm Dr. Burnet's and Dr. Jean Macnamara's observation that immunity to local virus does not result in immunity to the virulent Rockefeller M.V. strain.

In co-operation with Dr. Morgan and Dr. Southby, it is hoped to test pooled normal sera for use in curative therapy.

### *The Biochemical Department.*

Much of the work of this department has been in co-operation with other workers in the Institute. Miss Freeman has co-operated with Dr. Burnet in work on the preparation of staphylococcal toxin and Mr. Holden has been engaged with Dr. Kellaway in studies on the changes in direct and indirect chronaxie in curarisation and fatigue and in the fractionation of snake venoms.

Mr. Holden and Miss Freeman have completed their work on the action of formaldehyde on amino-acids. Their observations show that the velocity of reaction of an amino-acid with formaldehyde is greatly influenced by its constitution. Histidine and tyrosine react more rapidly than the simpler amino-acids, and the former possesses a greater affinity for formaldehyde than do proteoses and peptones, which themselves react more readily than the simple amino-acids. Absence of reaction in acid solution may indicate that the reaction occurs between formaldehyde and the undissociated amino group. The reaction with meta-proteins is to some extent reversible. Following the action of formaldehyde there was but little change in optical rotation of the amino-acids studied.

### *Publication.*

HOLDEN, H. F., and
FREEMAN, MAVIS:

"The Action of Dilute Formaldehyde Solutions on Some Amino Acids."
Australian Journal of Experimental Biology and Medical Science, 9 (1931), 189.

Mr. Holden has also concluded some work in co-operation with Professor Hicks upon the ultra violet absorption of iminazole derivatives. Histidine specially purified by crystallisation of its dinitro-naphthol-sulphonate showed no band in the nearer ultra-violet region. Other derivatives behaved similarly, except iminazole 4, 5, dicarboxylic acid, which unexpectedly presented an intense band at 250 A°U.

### *Publication.*

Hicks, C. S., and
Holden, H. F.:

"The Absorption of Ultra-violet Light by Iminazole, and Some of its Derivatives."
Australian Journal of Experimental Biology and Medical Science, 10 (1932), 49.

### *Work in Progress.*

Miss Freeman has prepared a large series of individual proteins of ox serum in order to study the influence of different methods of precipitation on the optical activity of the protein, and Mr. Holden is continuing his work in association with Professor Hicks on the ultra-violet absorption of certain proteins. An attempt is being made to photograph the spectrum of reduced haemoglobin in an indifferent atmosphere in order to avoid the absorptive effects of any reducing agent.

### *The Bendien Test for Cancer.*

A group of workers have made a series of observations on the recently described Bendien test for cancer. This consists in the precipitation of the sera by a series of mixtures of sodium vanadate and acetic acid containing increasing amounts of the former and diminishing amounts of the latter. The ultra-violet absorption spectra of the protein precipitates in 1% solution permits, according to Bendien, of the differentiation of cancerous from other sera.

Since workers elsewhere had indicated that the spectrophotometric method applied to Bendien's precipitates has no value in the diagnosis of cancer, and since the initial precipitation test is extremely non-specific, we sought to find whether in the initial test estimations of the amount of precipitation in the tubes or quantitative determinations of the amounts of vanadium left in the supernatant fluids would give more specific results. This we found not to be the case. In the preliminary test cancerous sera could not be differentiated from those of persons suffering from recent trauma, acute or chronic infections or a number of other conditions.

The results of quantitative analysis of the amount of unprecipitated vanadium and our estimation by eye of the amounts of precipitate in the tubes were reciprocal, and it was possible to predict one from the other. Neither were found to add anything to the specificity of the test.

*Publication.*

FREEMAN, MAVIS,
HOLDEN, H. F.,
LEMPRIERE, W. W.,
SCOTT, R. KAYE,
WILLIAMS, F. E., and
KELLAWAY, C. H.:

"Some Observations on the Bendien Test for Cancer."
Medical Journal of Australia, Dec. 19, 1931, 778.

*Goitre.*

Dr. Keith D. Fairley, Howard Fulford Scholar of Trinity College, has reviewed the literature on the prophylaxis of endemic and sporadic goitre. He concluded that the individual general practitioner could play a most important part in the prevention of goitre by instituting appropriate iodine therapy to his patients, especially about the time of puberty and during pregnancy. Simple goitre is sufficiently common in certain parts of Australia to demand that the health authorities should take steps to institute prophylactic measures.

He has also investigated the immediate and the end results of treatment in a series of 353 patients operated on at the Melbourne Hospital for toxic goitre in the preceding nine years. Methods for reducing the immediate surgical mortality rate of 4.8% were considered. It was found that injury to the recurrent laryngeal nerves at operation was more common than was generally realised. The value of pre-operative iodine therapy was demonstrated and it was shown that any operation less extensive than a sub-total thyroidectomy fails to give satisfactory end results in a large proportion of cases.

*Publications.*

FAIRLEY, K. D.:

"Goitre Prophylaxis."
Medical Journal of Australia, Nov. 28 (1931), 681.

"Results of Surgical Treatment in Toxic Goitre."
Melbourne Hospital Clinical Reports, 2 (1931), 79.

*Oral Sepsis.*

Dr. J. M. Lewis and Dr. A. Amies are continuing their work on the pathology of bony and soft oral tissues and on the histology of teeth found in dermoid cysts.

*Morbid Anatomy.*

During the year 567 autopsies were performed, the great majority of this number by Dr. Wright Smith. Dr. C. H. Mollison and Dr. Wright Smith were responsible for the examination of biopsy material. The routine photography has been carried out by Miss Helen Wischusen.

Histological Examinations for the diagnosis of pathological material by Dr. C. H. Mollison and Dr. Wright-Smith numbered 990. In addition, 749 histological sections of post mortem material were made.

*Publications.*

WRIGHT-SMITH, R. J.:

"Demonstration of Pathological Specimens."
Melbourne Hospital Clinical Reports, 2 (1931), 123.

"Demonstration of Intracranial Tumours."
Melbourne Hospital Clinical Reports, 3 (1932).

"Toxic Goitre."
Melbourne Hospital Clinical Reports, 3 (1932), 17.

*Museum.*

We are indebted to Dr. C. H. Mollison, Dr. Roy Chambers, Mr. B. T. Zwar, and Mr. B. Kilvington for the gift of rare specimens.

Forty new specimens have been added during the past year, including examples of tricuspid stenosis, syphilis of the oesophagus, syphilitic osteitis of the skull, vegetative endocarditis of the tricuspid valve, malignant meningioma, hydatidiform mole, Krukenburg tumours of the ovaries, tuberculomata of brain and spinal cord, tuberculosis of the liver, gumma of the heart, and carcinoma of the ileum.

The Museum has again been widely used by the hospital honorary staff, by University lecturers, and by candidates for higher degrees.

### *Biochemistry, Electrocardiography, and Basal Metabolism.*

The routine services in biochemistry and basal metabolism have been continued with efficiency and minimum cost under the direction of Miss Beryl Splatt. Miss Margaret Green has given most useful help in an honorary capacity.

After seven years of invaluable service, Mrs. L. F. Miller, who gave up her position as electrocardiographist in order to be married in August, 1931, has once more placed us in her debt by giving her services as electrocardiographist in an honorary capacity.

We are also very greatly indebted to the ladies of the Box Hill Auxiliary for the munificent gift of a Matthews portable electrocardiograph, which has already proved of great value.

### *Bacteriology and Clinical Pathology.*

In this department an increasing amount of work has been done by Drs. Bryce and Gardner. In addition to the routine bacteriological, serological and microscopical examinations, the skin tests for the allergic clinic and the typing of donors for the Red Cross blood transfusion service have been continued.

Miss Williams has, as heretofore, been responsible for a number of special serological tests.

### *Teaching.*

The August course arranged by the Melbourne Permanent Post Graduate Committee for 1931 was delivered by Dr. Burnet, who gave a most interesting series of six lectures on a number of aspects of bacteriology and immunology. Drs. Bryce and Gardner, Mrs. Miller and Miss Splatt were responsible for a series of excellent demonstrations at the annual refresher course.

In February, at the Melbourne meeting of the College of Surgeons of Australasia, demonstrations were given at this Institute on Australian snake venoms by Dr. Kellaway, and on pathological specimens by Dr. Wright-Smith. In April, Dr. Wright-Smith gave a demonstration to the Clinical Society on intracranial tumours.

Last year Dr. Kellaway conducted tutorial classes in Physiology for the primary examination of the Royal College of Surgeons, and Dr. Wright-Smith gave a course of lectures in Pathology to fourth year students, and another in elementary bacteriology to the nursing staff.

Practical experience in Clinical Pathology has been gained by hospital registrars, and by the sixth year students under the direction of Drs. Bryce and Gardner.

### *The Library.*

Our thanks for the gift of journals and books are due to the following:—

Dr. S. O. Cowen, Miss Danks, Dr. K. D. Fairley, Dr. C. H. Kellaway, L'Académie Royale de Medicine de Belgique, the Commonwealth Department of Health, the Council of Scientific and Industrial Research, the National Institute of Medical Research (London), the Royal Society of New South Wales, the Medical Society of Victoria, the Rockfeller Institute (New York), la Société royale des Sciences Médicales, Cancer Research Committee (Sydney), Universities Biblioteket (Lund, Sweden).

# Walter and Eliza Hall Institute of Research in Pathology and Medicine.

## FINANCIAL STATEMENT FOR THE YEAR ENDED 30th JUNE, 1932.

### INCOME ACCOUNT, 30th JUNE, 1932.

*Receipts.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To Balance brought forward from 30th June, 1931 | | | | £4,545 | 14 | 1 |
| Trustees Walter & Eliza Hall Trust | £3,200 | 0 | 0 | | | |
| University of Melbourne | 750 | 0 | 0 | | | |
| Trustees late Alfred Felton | 240 | 0 | 0 | | | |
| Trustees late T. J. Sumner. | 17 | 0 | 0 | | | |
| Dr. F. L. Orr | 5 | 5 | 0 | | | |
| Interest on Investments | 144 | 19 | 2 | | | |
| Fees Received for tests, media supplied, etc. | 336 | 10 | 6 | | | |
| | | | | 4,693 | 14 | 8 |
| | | | | £9,239 | 8 | 9 |

*Expenditure.*

| | | | | | | |
|---|---|---|---|---|---|---|
| By Apparatus | £73 | 19 | 3 | | | |
| Fittings and Equipment | 12 | 6 | 11 | | | |
| Repairs to Apparatus | 9 | 9 | 7 | | | |
| Repairs to Buildings | 7 | 2 | 3 | | | |
| Materials | 468 | 19 | 6 | | | |
| Publications | 56 | 2 | 2 | | | |
| Salaries and Wages | 4,078 | 6 | 0 | | | |
| Sundries | 81 | 11 | 9 | | | |
| | | | | £4,787 | 17 | 5 |
| Biochemical Dept.—Advance | | | | 77 | 17 | 2 |
| Balance— | | | | | | |
| Fixed Deposit, 3½% | 1,000 | 0 | 0 | | | |
| Fixed Deposit, 3% | 1,000 | 0 | 0 | | | |
| Credit Foncier Debenture Stock, £4/1/4% | 875 | 0 | 0 | | | |
| Cash with Agent-General, London | 48 | 5 | 0 | | | |
| Secretary's Advance A/c—E., S. & A. Bank | 100 | 0 | 0 | | | |
| Bank of New South Wales | 1,350 | 9 | 2 | | | |
| | | | | 4,373 | 14 | 2 |
| | | | | £9,239 | 8 | 9 |

## BIOCHEMICAL ENDOWMENT ACCOUNT.

| | | | | |
|---|---|---|---|---|
| To Balance brought forward from 30th June, 1931 .. .. .. .. .. .. .. .. .. .. | £8,591 10 3 | By Bank Charges .. .. .. .. .. .. .. .. | | £1 12 6 |
| Interest on Investments .. .. .. .. .. .. .. | 479 14 8 | Transferred to Biochemical Dept. A/c .. | | 478 2 2 |
| | | Balance— | | |
| | | Com'wealth Ins. Stock— | | |
| | | 4%, 15/12/38 .. .. .. .. | £200 0 0 | |
| | | 4%, 15/11/41 .. .. .. .. | 300 0 0 | |
| | | 4%, 15/10/44 .. .. .. .. | 140 0 0 | |
| | | City of Melb. Debs, 5½%, 1937 .. .. .. .. .. .. .. | 807 12 2 | |
| | | M. & M. Board of Works— | | |
| | | Inscr. Stock, 4%, 1945 | 1,218 4 3 | |
| | | Inscr. Stock, 6½%, 1937 | 1,952 11 1 | |
| | | Melbourne Harbour Trust Debentures, 5⅝%, 1949. | 500 0 0 | |
| | | Credit Foncier, Debenture Stock, £4/1/4%, 1941.. | 621 5 0 | |
| | | Mortgage, £5/0/9% .. .. | 2,550 0 0 | |
| | | Mortgage, £5/8/6% .. .. | 300 0 0 | |
| | | Bank of New South Wales | 1 17 9 | |
| | | | | 8,591 10 3 |
| | £9,071 4 11 | | | £9,071 4 11 |

## BIOCHEMICAL DEPARTMENT ACCOUNT.

| | | | | |
|---|---|---|---|---|
| To Interest transferred from Endowment Account .. .. .. .. .. .. .. .. .. .. | £478 2 2 | By Materials and Apparatus .. | £4 18 8 | |
| Advance from Working Account .. .... | 77 17 2 | Salaries and Wages.. .. .. | 551 0 8 | |
| | | | | £555 19 4 |
| | £555 19 4 | | | £555 19 4 |

## LIBRARY ACCOUNT.

| | | | | | |
|---|---|---|---|---|---|
| To Balance brought forward from 30th June, 1931 .. .. .. .. .. .. .. .. .. .. .. | | £2,020 12 10 | By Books, Journals, and Bookbinding .. .. | | £90 8 4 |
| Interest on Investments .. | £105 17 8 | | Balance— | | |
| Premium on Conversion .. | 30 0 0 | | Com'wealth Ins. Stock— | | |
| | | 135 17 8 | 4%, 15/12/38 .. .. .. | £200 0 0 | |
| | | | 4%, 15/11/41 .. .. .. | 300 0 0 | |
| | | | 4%, 15/10/44 .. .. .. | 530 0 0 | |
| | | | Mortgage .. .. .. .. .. .. | 1,000 0 0 | |
| | | | Bank of New South Wales | 36 2 2 | |
| | | | | | 2,066 2 2 |
| | | £2,156 10 6 | | | £2,156 10 6 |

### Auditor's Certificate.

I have to report that I have completed the Audit of the Books and Accounts of the Institute for the period ended June 30th, 1932. I have verified all receipts, and have had vouchers produced for all disbursements. All information and explanations required have been given. The Statement is a correct Statement of Receipts and Expenditure as revealed by the books of the Institute.

Dated 7th July, 1932.

W. M. JARVIE, F.C.A. (Aust.), Auditor.